

**66133****3N261****3N262****3N263****TO-18 OPTOCOUPLERS**
**OPTOELECTRONIC PRODUCTS  
DIVISION**

12/01/2014

**Features:**

- High Reliability
- Electrically similar to 4N47, 4N48, 4N49
- Base lead eliminated for improved noise immunity
- Rugged package
- +1 kV electrical isolation
- Stability over wide temperature range

**Applications:**

- Eliminate ground loops
- Level shifting
- Line receiver
- Switching power supplies
- Motor control

**DESCRIPTION**

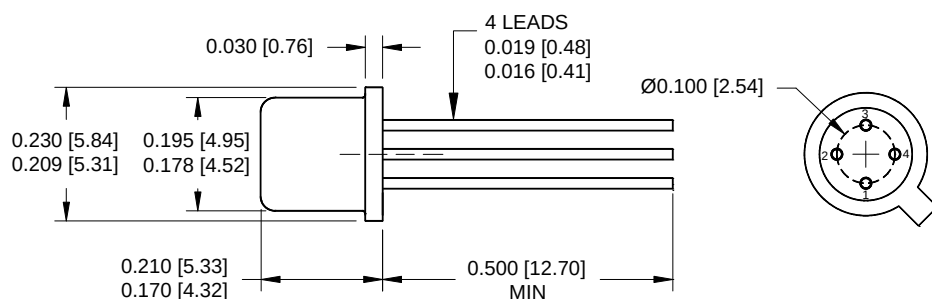
The **66133** contains an infrared LED optically coupled to a silicon phototransistor in a hermetic 4 lead TO-18 package. The collector of the phototransistor is electrically connected to the case. The internal base connection has been eliminated for improved noise immunity. The 3N261, 3N262 and 3N263 can be supplied to commercial or screened quality levels as well as to customer specifications.

**ABSOLUTE MAXIMUM RATINGS**

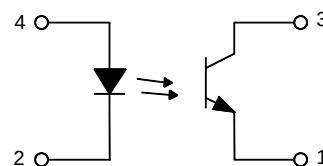
|                                                                                                    |                 |
|----------------------------------------------------------------------------------------------------|-----------------|
| Input to Output Voltage .....                                                                      | 1000 V          |
| Emitter-Collector Voltage .....                                                                    | 7 V             |
| Collector-Emitter Voltage .....                                                                    | 40 V            |
| Reverse Input Voltage .....                                                                        | 2 V             |
| Input Diode Continuous Forward Current at (or below) 65°C Free-Air Temperature (see note 1) .....  | 40 mA           |
| Continuous Collector Current .....                                                                 | 20 mA           |
| Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (see Note 2) ..... | 190 mW          |
| Storage Temperature .....                                                                          | -55°C to +150°C |
| Operating Free-Air Temperature Range .....                                                         | -55°C to +125°C |
| Lead Solder Temperature (10 seconds max, 1/16" from case) .....                                    | 240°C           |

**Notes:**

1. Derate linearly to 125°C free-air temperature at the rate of 0.67 mA/°C.
2. Derate linearly to 125°C free-air temperature at the rate of 1.9 mW/°C.

**Package Dimensions**

ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]

**Schematic Diagram**

THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE.

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**66133**     **3N261**  
                  **3N262**  
                  **3N263**

**TO-18 OPTOCOUPLEDERS**

12/01/2014

**ELECTRICAL CHARACTERISTICS**  
**INPUT LED**

T<sub>A</sub> = 25°C

| PARAMETER                          | SYMBOL         | MIN | TYP | MAX | UNITS | TEST CONDITIONS        |
|------------------------------------|----------------|-----|-----|-----|-------|------------------------|
| Input Diode Static Reverse Current | I <sub>R</sub> |     |     | 100 | nA    | V <sub>R</sub> = 2 V   |
| Input Diode Static Forward Voltage | V <sub>F</sub> | 0.8 |     | 1.5 | V     | I <sub>F</sub> = 10 mA |

**OUTPUT TRANSISTOR**

T<sub>A</sub> = 25°C

| PARAMETER                           | SYMBOL                | MIN | TYP | MAX | UNITS | TEST CONDITIONS                               |
|-------------------------------------|-----------------------|-----|-----|-----|-------|-----------------------------------------------|
| Collector-Emitter Breakdown Voltage | V <sub>(BR)</sub> CEO | 40  |     |     | V     | I <sub>C</sub> = 1 mA, I <sub>F</sub> = 0     |
| Emitter-Collector Breakdown Voltage | V <sub>(BR)</sub> ECO | 7   |     |     | V     | I <sub>E</sub> = 100 μA, I <sub>F</sub> = 0   |
| Collector Dark Current              | I <sub>D</sub>        |     |     | 100 | nA    | V <sub>CE</sub> = 20 V, I <sub>F</sub> = 0 mA |

**COUPLED CHARACTERISTICS**

T<sub>A</sub> = 25°C

| PARAMETER                                                        | SYMBOL               | MIN  | TYP            | MAX            | UNITS | TEST CONDITIONS                                                                                                                                |
|------------------------------------------------------------------|----------------------|------|----------------|----------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------|
| On State Collector Current     3N261                             | I <sub>C(ON)</sub>   | 0.5  |                |                | mA    | V <sub>CE</sub> = 5 V, I <sub>F</sub> = 1 mA                                                                                                   |
| On State Collector Current     3N262                             | I <sub>C(ON)</sub>   | 1    |                |                | mA    | V <sub>CE</sub> = 5 V, I <sub>F</sub> = 1 mA                                                                                                   |
| On State Collector Current     3N263                             | I <sub>C(ON)</sub>   | 2    |                |                | mA    | V <sub>CE</sub> = 5 V, I <sub>F</sub> = 1 mA                                                                                                   |
| Collector-Emitter Saturation Voltage     3N261<br>3N262<br>3N263 | V <sub>CE(SAT)</sub> |      |                | 0.3            | V     | I <sub>F</sub> = 2 mA, I <sub>C</sub> = 0.5 mA<br>I <sub>F</sub> = 2 mA, I <sub>C</sub> = 1 mA<br>I <sub>F</sub> = 2 mA, I <sub>C</sub> = 2 mA |
| Rise Time     3N261<br>3N262<br>3N263                            | t <sub>r</sub>       |      | 10<br>10<br>15 | 20<br>20<br>25 | μs    | V <sub>CE</sub> = 10 V, I <sub>F</sub> = 5 mA, R <sub>L</sub> = 100 Ω                                                                          |
| Fall Time     3N261<br>3N262<br>3N263                            | t <sub>f</sub>       |      | 10<br>10<br>15 | 20<br>20<br>25 | μs    | V <sub>CE</sub> = 10 V, I <sub>F</sub> = 5 mA, R <sub>L</sub> = 100 Ω                                                                          |
| DC Isolation Voltage                                             | V <sub>IO</sub>      | 1000 |                |                | V     | I <sub>IO</sub> = 100 nA                                                                                                                       |

**RECOMMENDED OPERATING CONDITIONS:**

| PARAMETER                 | SYMBOL          | MIN | MAX | UNITS |
|---------------------------|-----------------|-----|-----|-------|
| Input Current, Low Level  | I <sub>FL</sub> | 0   | 10  | μA    |
| Input Current, High Level | I <sub>FH</sub> | 1   | 20  | mA    |
| Supply Voltage            | V <sub>CE</sub> | 5   | 10  | V     |

**SELECTION GUIDE**

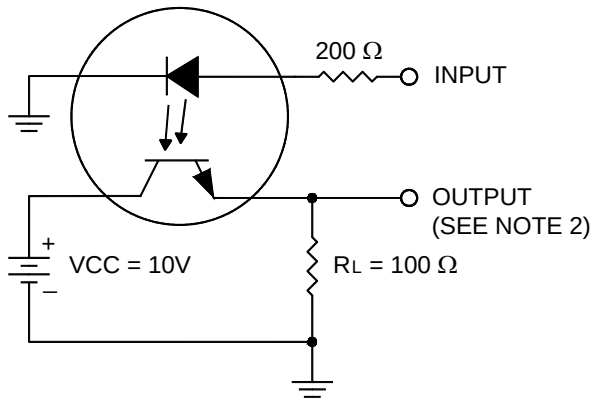
| PART NUMBER | PART DESCRIPTION  |
|-------------|-------------------|
| 66133-001   | 3N261, Commercial |
| 66133-002   | 3N262, Commercial |
| 66133-003   | 3N263, Commercial |
| 66133-101   | 3N261R, Screened  |
| 66133-102   | 3N262R, Screened  |
| 66133-103   | 3N263R, Screened  |

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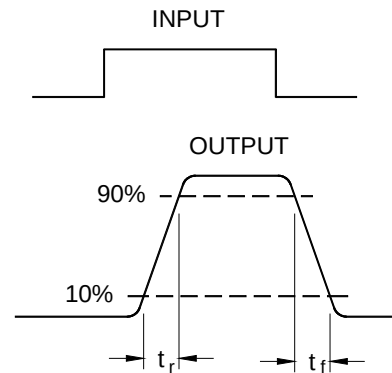
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## PARAMETER MEASUREMENT INFORMATION

ADJUST AMPLITUDE OF INPUT PULSE FOR  $I_{F(ON)} = 5 \text{ mA}$



TEST CIRCUIT

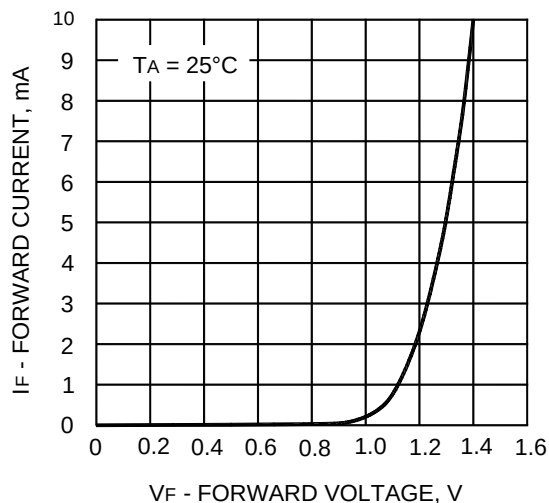


VOLTAGE WAVEFORM

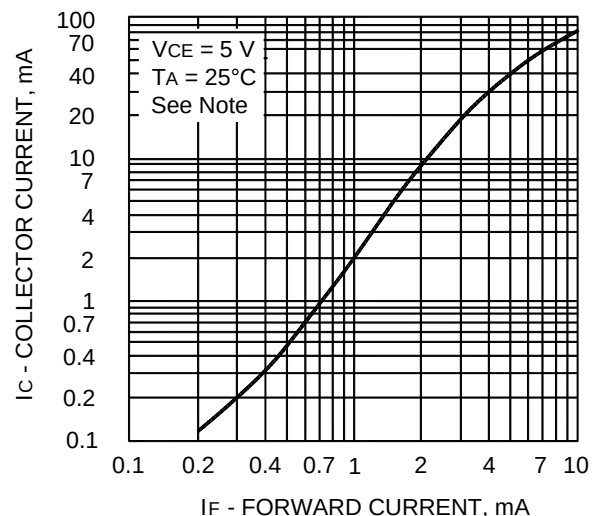
- NOTES: 1. The input waveform is supplied by a generator with the following characteristics:  $Z_{OUT} = 50 \Omega$ ,  $t_r \leq 15 \text{ ns}$ , Duty cycle  $\approx 1\%$ ,  $t_w = 100 \mu\text{s}$ .  
2. Waveforms are monitored on an oscilloscope with the following characteristics:  $t_r \leq 12 \text{ ns}$ ,  $R_{IN} \geq 1 \text{ M}\Omega$ ,  $C_{IN} \leq 20 \text{ pF}$

## TYPICAL CHARACTERISTICS

INPUT DIODE FORWARD CONDUCTION CHARACTERISTICS



3N262  
COLLECTOR CURRENT  
vs  
INPUT DIODE FORWARD CURRENT

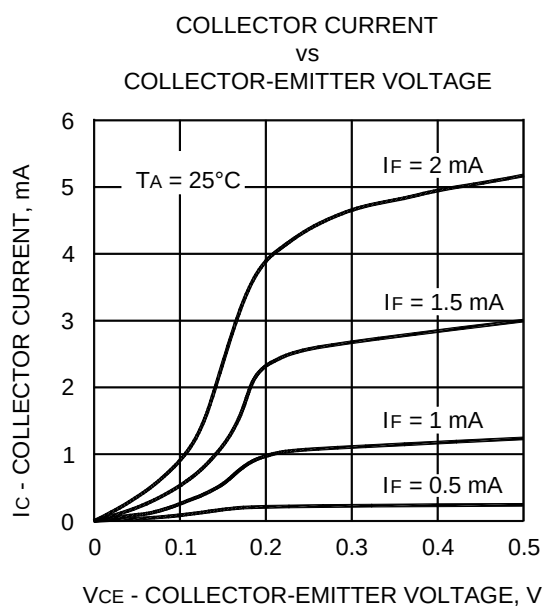
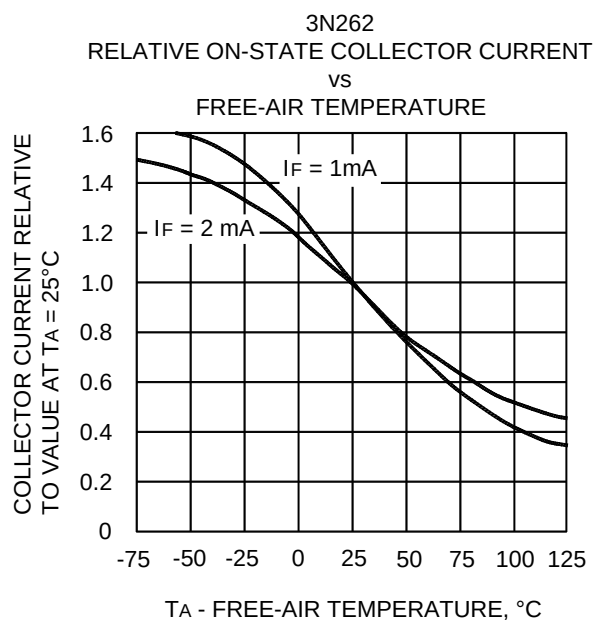


NOTE: This parameter was measured using pulse techniques.  $t_w = 100 \mu\text{s}$ , duty cycle = 1%.

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TYPICAL CHARACTERISTICS (CONTINUED)



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